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Giovanni user image page on GES DISC Web site

In May, prompted by the widespread public interest in the eruption of the Eyjafjallajökull volcano in Iceland (subject of another article in this newsletter), we created a new page for user contributions of Giovanni images.

The idea of this page is for our user community – we know you're out there – to use Giovanni to look at an event of some kind, create a Giovanni image, and send the image to us, along with a short description of the subject of the image, processing details, why it's a subject of interest, etc.

Any images posted to this page will also be the subject of a posting on our Giovanni Facebook page (NASA Giovanni Remote Sensing Data Analysis), where members of the group can comment on the image.

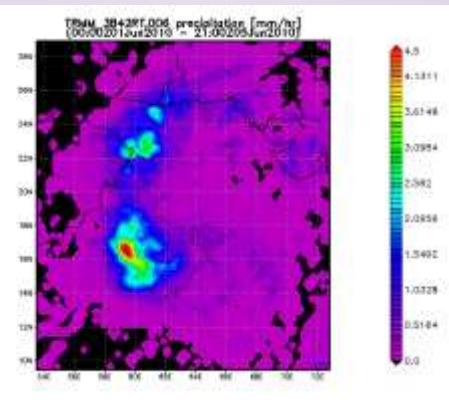
To add an image to the Giovanni user image page, just send it to jim.acker@nasa.gov, along with the accompanying description, and we'll post it right away. The image can be posted with the name of the author, or anonymously.

The URL for the page:

http://disc.sci.gsfc.nasa.gov/giovanni/giovanni_user_images/

Example image from the page:

Tropical Rainfall Measuring Mission precipitation (mm/hr) image of Typhoon Phet, June 1-5, 2010, visualized with the Purple-Red-Stripes color palette.



Giovanni publications on record-setting pace in 2010

Every so often (every other month, approximately) we search the Web with Google Scholar and a few other ways, to find new research publications which have utilized Giovanni. As more and more researchers have discovered how easy it is to use Giovanni, and how quickly they can prepare publication-quality images to accompany their research papers, the list of Giovanni publications has grown at an accelerating rate. In 2009, there were 85 peer-reviewed papers; by the end of June 2010, there were already 52 (the News item says 49, but a few more were found following publication of that news story). Will the “100 publication” milestone be surpassed in 2010? Like the potential for a new global temperature record, we'll just have to wait until early 2011 to find out.

The Giovanni Publications page: <http://disc.sci.gsfc.nasa.gov/giovanni/additional/publications/>

Giovanni brochure goes online

We realize that not everyone can get to a meeting or a workshop where we hand out the visually-stunning Giovanni brochure; so we have now put a PDF version of the brochure online, where it can be downloaded and examined at leisure, and even printed (but that would use a lot of black ink). The link to the brochure is on our “What is Giovanni” page:

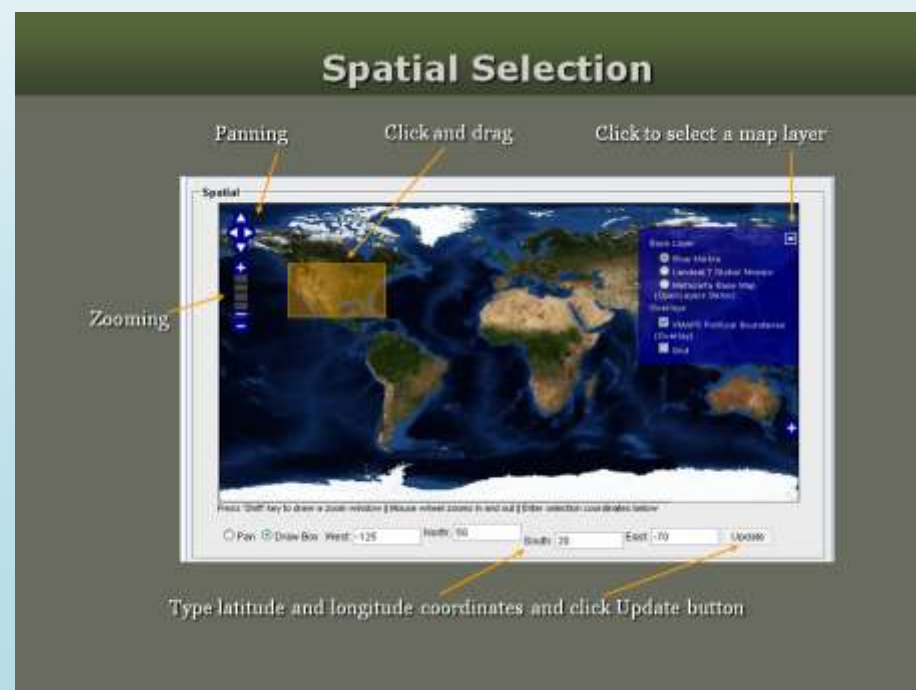
<http://disc.sci.gsfc.nasa.gov/giovanni/overview/what-is-giovanni/>

It seems timely that one of the plots in the brochure is a TRMM time-series of the rainfall peaks from hurricanes Emily, Katrina, and Rita in the Gulf of Mexico, given that 2010 is now being projected to be a very active Atlantic hurricane season.

ARSET: Presentation resources on remote sensing

One of the best resources currently available for in-depth treatment of the advantages, disadvantages, insights, and misconceptions of scientific remote sensing is the Applied Remote Sensing Education and Training (ARSET) Web site, <http://arset.gsfc.nasa.gov/>. The ARSET site features 17 general information presentations and two presentations about air quality, all downloadable in Powerpoint format, and in both English and Chinese versions. Many other presentations can also be found for past training activities. The use of Giovanni and other NASA Web tools to examine NASA remote sensing data for applications is explored in several presentations. ARSET is intended primarily for professional audiences, but many presentations should be useful for environmental educators.

ARSET is led by Ana Prados (Goddard Earth Sciences Data and Information Services Center / UMBC), in collaboration with Richard Kleidman (Goddard Space Flight Center / Science Systems and Applications, Inc.); and Sundar Christopher (University of Alabama/Huntsville). Support for ARSET is provided by Lawrence Friedl, NASA HQ. Other members of the GES DISC staff contributed to the development of Giovanni ARSET presentations.



At left, a sample slide from ARSET presentation #12, *The GES DISC Giovanni Tool for Data Access, Visualization and Analysis*, authored by Hualan Rui. This slide demonstrates all of the options available for the selection of a spatial area of interest in Giovanni.

Featured Giovanni interface: TES Giovanni

This issue of *The Giovanni News* features the first of a series of articles briefly describing a specific Giovanni data interface. The inaugural featured interface is for the Tropospheric Emission Spectrometer (TES). TES is one of the four instruments on the NASA Earth Observing System Aura satellite, which was launched on July 15, 2004, from Vandenberg Air Force Base. One reason for the selection of the TES Giovanni interface was to note the sixth anniversary of the launch of Aura.

TES is a Fourier Transform infrared spectrometer (FTIR). (Parts of the following description of TES were acquired from the TES Web site, <http://tes.jpl.nasa.gov/>). TES measures the infrared-light energy (radiance) emitted by Earth's surface and by gases and particles in the troposphere. The basic principle of FTIR's is to split and recombine a beam of light such that the recombined beam produces a wavelength-dependent interference pattern. Every substance (so long as it is warmer than absolute zero) emits infrared radiation at certain signature wavelengths — emissivity is a measure of a material's ability to absorb and radiate energy. The TES instrument was designed with very fine spectral resolution, making one scan every 4 or 16 seconds for corresponding spectral resolutions of 0.1 cm^{-1} or 0.025 cm^{-1} , respectively. This fine spectral resolution enables TES to pinpoint the wavelengths at which key substances are emitting, and measure their pressure-broadened infrared absorption lines in the troposphere. Because the emissivity spectra are temperature and pressure dependent, TES can determine the altitude at which the chemical species are located, and precisely examine concentrations in the troposphere (the layer of atmosphere closest to the Earth's surface).

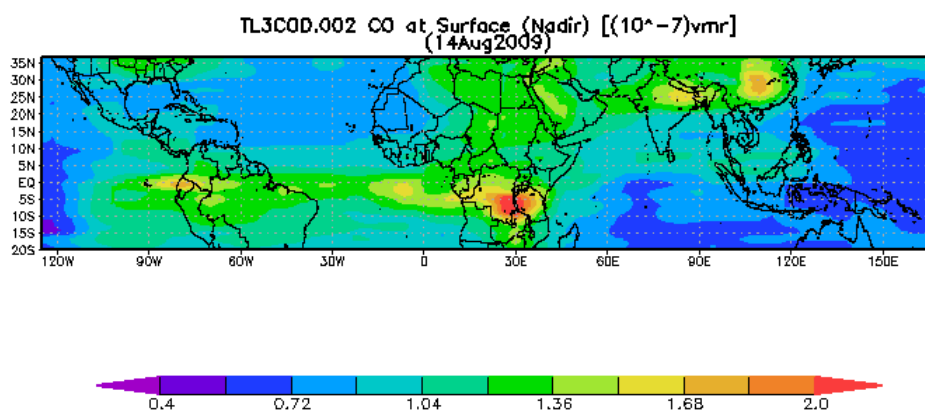
The TES Giovanni interface provides the following data parameters: air temperature, surface temperature, methane (CH_4), carbon monoxide (CO), water vapor (H_2O), deuterated water vapor (HDO), nitric acid (HNO_3), and ozone (O_3). One of the unique aspects of the TES Giovanni interface is that most of the parameters are available either as two-dimensional (2D) or three-dimensional (3D) data. 3D data can be displayed as a profile plot.

An important part of the TES Giovanni interface is that the instrument repeatedly collects data in Global Survey mode. Each Global Survey takes one or two days to complete. The TES observational plan has changed over the course of the mission; the primary plan was to conduct Global Surveys every two days, and reserve an intervening day for Special Observations. If no Special Observations were required, the instrument was turned off, to reduce instrumental wear and lengthen the operational lifetime of the instrument. Thus, a calendar of data availability should be consulted before requesting a Giovanni data plot, to make sure that data are available for a particular day.

TES data allow examination of a number of different phenomena in the Earth's atmosphere and climate system. The CO data can be used to track the extent and impact of biomass burning, as well as tropospheric pollution in urban areas. TES examines some of the factors that contribute to the formation of ozone near the Earth's surface, where it is an annoying component of smog; the reactions of nitrogen compounds with volatile organic compounds contribute to the formation of ozone. (That's why red-alert pollution warnings admonish citizens not to fill up vehicle gas tanks during the heat of a summer day.) TES also allows monitoring of the concentrations of many greenhouse gases (GHGs) related to climate change, particularly methane and water vapor. It was recently announced that TES is now producing a data set for the well-known GHG, carbon dioxide, CO_2 .

The TES Giovanni interface is located here:

http://gdata1.sci.gsfc.nasa.gov/daac-bin/G3/gui.cgi?instance_id=tes_l3daily



Giovanni plot of TES CO surface concentrations, August 14, 2009, showing likely production of CO due to biomass burning in South America and Africa, and air pollution in India and China.

Giovanni presentations to educators at GSFC in July

During the month of July 2010, five different groups of educators will be visit GSFC to learn about NASA remote sensing data and how such data can be utilized in education, for basic science and math skills and environmental education. One group, the **Eyes in the Sky II** project (<http://serc.carleton.edu/eyesinthesky2/index.html>), will learn about using Giovanni for oceanographic applications. The other groups will hear a general Giovanni presentation. All of the teachers will get hands-on practice with Giovanni. Over 400 educators will participate in these activities, which also provide in-service credit for continuing education.



Follow **nasa_gesdisc** and **nasa_giovanni** on Twitter!

In addition to our Giovanni Facebook group, there are now two Twitter feeds, for **nasa_gesdisc** and **nasa_giovanni**, providing pertinent information about GES DISC Earth observation data and the myriad ways to use Giovanni for research and insight. We invite you to follow us!

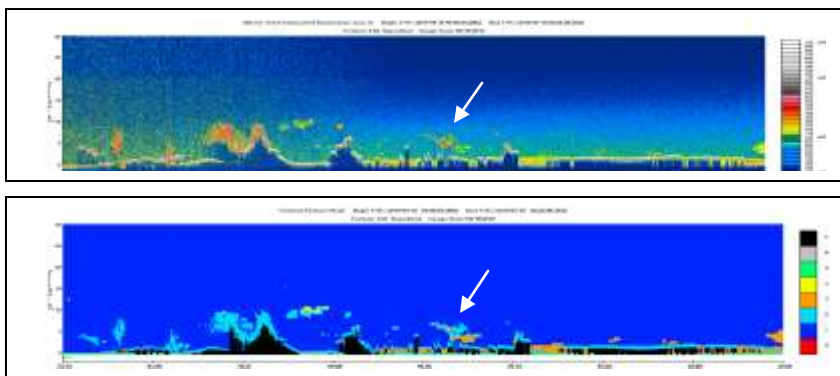
Eyjafjallajökull ash cloud 'Image of the Day': the back-story!

The eruption of the Eyjafjallajökull volcano in Iceland in April and May provided some striking pictures of volcanic activity. It also produced controversy and consternation due to the shutdown of many airports in Europe for safety, to avoid the potential hazards of an aircraft encountering a dangerous volcanic dust cloud while in flight.

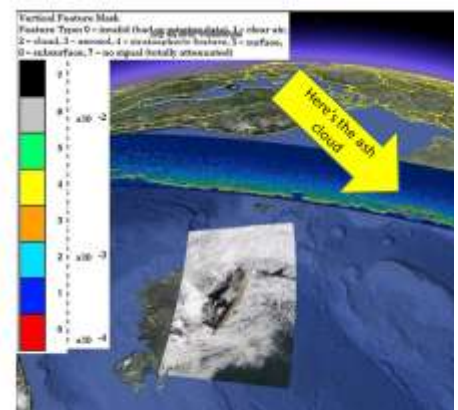
Giovanni's aerosol data products provided a good way to track the movement of the dust, ash, and sulfur dioxide from the volcano. But these products only provide a two-dimensional view; they don't provide the crucial third dimension of altitude, which is very important to aircraft for hazard avoidance. So we decided to see if our daily Cloudsat profiles in Giovanni (A-Train Data Depot) could detect the ash cloud. Numerous features of interest were observed, but nothing that was definitively ash – not too surprising, given that Cloudsat's Cloud Profiling Radar wasn't designed to detect aerosols! However, the Cloud-Aerosol Lidar with Orthogonal Polarization (CALIOP) on CALIPSO (<http://www-calipso.larc.nasa.gov/>) does detect atmospheric aerosols, as it was designed to do that. The GES DISC creates browse images of CALIOP curtain plots that can be displayed in Google Earth (KMZ files) for the CALIPSO mission, using the same software that creates the KMZ files in Giovanni. Searching through the curtain plot browse images discovered several features of interest, and using the Vertical Feature Mask (VFM) plot, these could even be tentatively identified as volcanic aerosols – in particular, a feature observed on May 16 over Scotland, the same day that some airports in the United Kingdom were shut down due to the volcanic ash danger. Google Earth was used to display the KMZ file to make sure it was indeed over Scotland.

We then communicated with the staff of the Earth Observatory to find out if they would be interested in our imagery for the well-known and widely-circulated 'Image of the Day'. The fuzziness of the browse image display didn't meet their standards for the stunning imagery they present daily. So they acquired the actual CALIOP data for the May 16 curtain plot, and, utilizing their image expertise, they created a beautiful representation of the ash cloud in both two and three dimensions, which became an 'Image of the Day' (<http://earthobservatory.nasa.gov/IOTD/view.php?id=44052/>).

Below are some of the browse images which led to our collaboration with the Earth Observatory.



(Top) 532 nm Total Attenuated Backscatter, (bottom) Vertical Feature Mask; arrows point to volcanic ash. (right) Curtain plot displayed in Google Earth.



Giovanni: Not just a data system— it's a phenomenon for phenomena
<http://giovanni.gsfc.nasa.gov/>